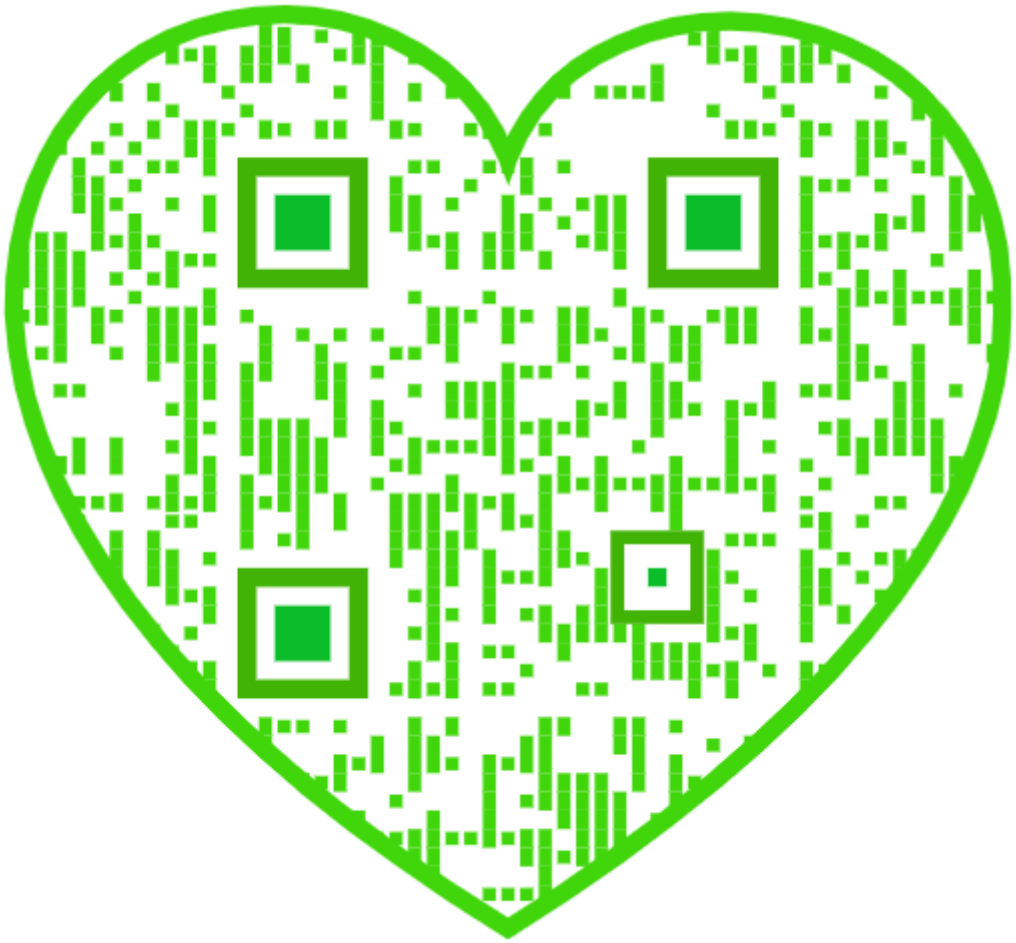
SHORT STUDIES IN BOTANY FOR CHILDREN

HARRIET C. COOPER.



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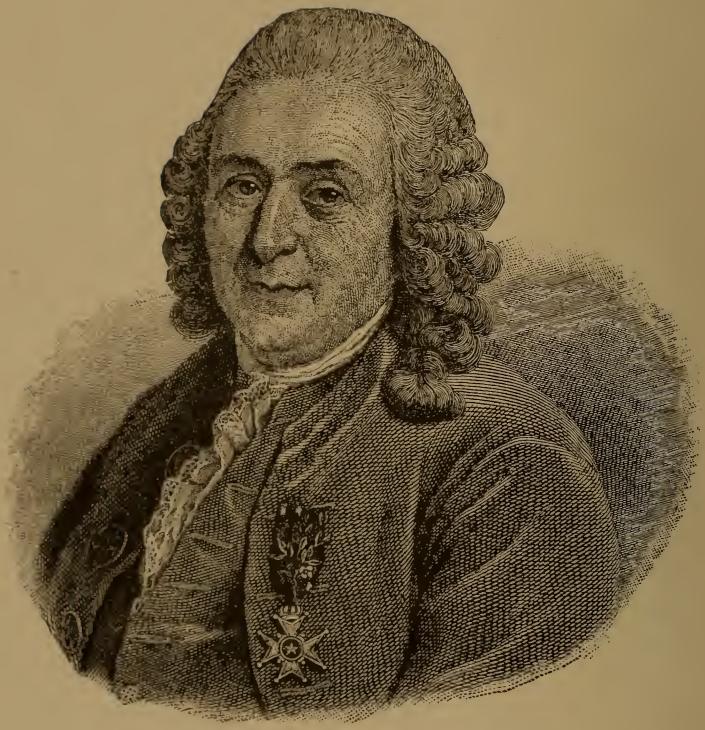

CARL LINNÆUS.

SHORT STUDIES IN BOTANY

FOR CHILDREN

BY

HARRIET C. COOPER

WITH FIFTY ILLUSTRATIONS

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SHORT STUDIES IN BOTANY.

CHAPTER I.

A FAMILY CIRCLE.

A GROUP of happy young people were seated on the steps of Mr. Stone's piazza. They were sisters and brothers and cousins and — one aunt. But Aunt Mary was a host in herself. One look into her face, and you would agree with her brother, who often declared that, "Everywhere Aunt Mary went, the girls were sure to go." Boys, too, he might have added, and even the unruly ones seemed to find a place in her heart and grow better there. Walks and talks with Aunt Mary were the rewards of duty well done, and many a

hard task was made lighter by her kindly aid and wise direction. There was no study this afternoon. They had been on a picnic, and were resting and talking it over, comparing collections of flowers, and mosses, and stones, and last year's birds' nests, and bugs, and beetles, and all sorts of boy and girl treasures. Little May wanted to know why Aunt Mary spoke of some flowers as belonging to the same family circle.

"You said the nightshade we found was poisonous, and that there were other poisonous plants in the same family."

"Yes," said Aunt Mary, "that is true, and with the poisonous ones are our nice white potatoes, and egg plants, and tomatoes. Then there are the tobacco, and capsicum, and the pretty petunia by the side of the henbane and belladonna — a curious family circle, is it not?"

"I should think there would be hot

Potato Plant and Tubers.

times between the fiery capsicum and nasty tobacco. I wouldn't sit, or grow either, beside such horrid neighbors," said Bessie, laughing.

"You'd like a cosey corner with the belladonna, wouldn't you?" said Frank, who was listening and bouncing his ball at the same time.

"Why?" asked Bessie, suspecting one of his jokes.

"Oh, belladonna means beautiful lady, doesn't it, Aunt Mary?"

"Yes; the name was given because it was once used to dilate the pupil of the eye and increase its brilliancy; but people are wiser, now that they know its injurious properties."

"But, Aunt Mary," persisted May, "why do you say they belong to the same family?"

"Because the flowers and seed are constructed on the same plan; they may not

look alike, yet you will find the important parts growing in the same way. Before you can understand it, May, I must teach

BELLADONNA.

you something about the organs of the flower. Come look at this one."

May's head was soon bending over the flower.

"Now, May, these flower leaves or petals are called the corolla, because they form a kind of cup. The little green leaves around the corolla are sepals, and form the calyx."

HENBANE.

"Do all flowers have a calyx?"

"No, your white lily has none; and there are flowers without a corolla — apetalous; that is, without petals."

"Why, I should not call that a flower."

"Not a perfect flower to look at, yet the petals are not the most important parts."

"What are, Aunt Mary?"

"The stamens and pistils — here they are."

"How shall I know stamens from pistils?"

"The pistils are in the centre of the flower and are rarely so numerous as the stamens; they have three parts, the stamens two. Here you see the little yellowish-brown tops to the stamens — the anthers — swinging like tiny bird-cages on top of the thread-like stems or filaments. You can easily remember those two parts of the stamen, the filament and anther. Now look at this anther under the microscope."

"Why, Aunt Mary, it's all covered with yellow dust! What is it?"

"The name is pollen. Many a bee gets

his legs all covered with the fine powder when he dives after the honey. Remember what the little seven-year-old said about 'the velvet bee, — '

> "'O velvet bee! you're a dusty fellow, —
> You've powdered your legs with gold,'"

said May, delighted that she could finish the stanza.

"Now let us examine the pistil, May. At the bottom is the germ or ovary; from the ovary rises a slender stem or style, and on top is the stigma — three parts you see — ovary, style, stigma. You do not find each part in all flowers. Sometimes the stigmas grow right on the ovary — no style at all. Sometimes the whole of the stamens grow on to the sides of the calyx, sometimes on the sides of the corolla. But the natural place for them is on the receptacle which is the end of the flower stem. Look closely now at this ovary which I have cut open."

"Yes, Aunt Mary, I see; there are little divisions in it."

"Little cells in which the seed will grow; in fact there are the tiny seeds forming in

Tobacco Plant.

this one where the flower has dropped off. As I told you before, the stamens and pistils are the important parts of the

flower. Without them your pretty peach-blossoms would make no fruit.

"Now, little one, you see the botanists study the construction of a plant — its stem, leaves, flower, and especially the stamens and pistils, and class them in families according to their resemblance. In this Nightshade family the likeness is in this — the plants all have rank-scented foliage, colorless juice; the parts of the flower are generally in fives — "

"What do you mean by fives?"

"That there are five petals, five sepals, five pistils, and the stamens are five or ten; then two cells in the ovary of the pistil, and many seeds. There are other family marks, which you may learn as you know more of plants."

"Thank you, Aunt Mary," came from a chorus of voices, as she rose to leave.

"You are quite welcome, friends." That was Aunt Mary's pet name for them all.

"Some day we will have another lesson in Botany."

"I don't call this a lesson," said May, looking as nearly resentful as she knew how. "Such pleasant talk isn't study. I'd go to school all the year if I had my lessons this way."

CHAPTER II.

THE ROSE FAMILY.

"GATHER them while the dew is upon them, Madge."

"What, mother?"

"The roses for your pot-pourri jars."

"Oh, yes, I had forgotten; come, Cousin May."

The pretty garden was full of roses, but the girls gathered only those sweet and full blown, and pulling off the petals, packed their jars full, then sprinkled over them a little salt, and added a few cloves. It was pleasant work, breathing the fragrant, fresh air, touching the cool, dewy leaves, and laughing gaily as showers of rose petals fell from some overladen bush.

BRANCH OF THE RED ROSE.

May, the little botanist, wondered to what family the rose belonged.

"There's mother," said Madge, "ask

her; but I know one thing, it is a royal flower, the flower of England."

"Oh, yes; and you remember our lesson on the wars of the Roses, when the house of York took a white rose for their badge and Lancaster a red rose. I'll be a Yorkist every time."

"And I a Lancaster," said Madge; "wouldn't you, mother?"

"I like each one too well to make war against it," said Mrs. Winter; "but you may go farther back than English history to find roses honored by royalty. The Romans were so fond of the flower that Nero had showers of roses sprinkled over his guests at his banquets, and Heliogabalus, another emperor, wanting to impress them with his luxury, showered roses over them in such quantities that several guests were suffocated before they could extricate themselves. The luxurious nobles slept on couches stuffed with rose

leaves. The rose was at first dedicated to the god of silence, and a rose hung over the table warned the guests that the conversation must not be repeated, it was *sub rosa*. In later times the flower was dedicated to the Virgin Mary. Oftentimes roses were scattered over the dishes on the table."

"Why, mother, that would be beautiful now; prettier than a pink tea, or yellow tea, or any kind of a tea that I know of."

"Aunt Mary, will our jars of rose petals make attar of roses?" asked May.

"No; only a sweet, fresh perfume for your rooms in summer. The attar is made from the damask rose; twenty thousand flowers are required to make half an ounce of oil, which once sold for fifty dollars."

"Will you tell us what family the rose belongs to?"

"It is of the Rose family, but you could not class it by one of these roses."

THE WILD ROSE.

"Why, mother, they are fine specimens!" said Madge.

"Yes, but made so by cultivation; they are not in the natural state of the plant. A wild rose is what you must study; that has only one row of petals."

"Oh, yes, like the eglantine which grandmother has planted near her window."

"Bring one of those, Madge."

Madge was off like a bird, and in a moment came with a handful of the roses, saying, "Grandmother calls them sweet-briar, and that is a good name, for even the leaves are sweet."

"Yes," said her mother; "under the green leaflets are small glands holding the perfume. Look into the centre of your little rose and see how full of stamens and pistils. Now look into one of your fine double roses."

"Why, mother, there are no stamens —

or perhaps here are one or two, but one of those is imperfect. What causes the difference?"

"Cultivation. Roses in their natural state have five broad petals, and a great many stamens. Now go and examine all the different roses, and tell me at breakfast what you have found out."

Half an hour later the girls came to report. "Could not wait for breakfast," as Madge said. "Why, mother, we found one rose which had lost some of its stamens, — they seemed to have changed into narrow petals — and in some roses they were part stamen and part petal; had turned slightly red on one side."

"Yes," added May, "and some had a little red on each side; that rose down by the garden gate, Aunt Mary."

"And, mother, in all those fine double roses the stamens had entirely disappeared."

"Yes; and the gardener has done more than that. In that ugly but curious green rose, the stamens have been changed by cultivation first to petals and then to green leaves. And in the damask rose we see occasionally a leafy branch occupying the place of stamens and pistils."

"Why, mother, I never heard of such a thing."

"Yet it is true. More than a hundred years ago the botanist Linnæus knew it, and now all agree with him that the stamen is a leaf, changed to suit a special purpose, and that cultivation may turn it back to a leaf."

"And now, Aunt Mary, tell us some of the rose's relations."

"That long row of spireas are close kin; but come to breakfast, and I'll give you an introduction to some other cousins."

The girls were not slow in accepting

the invitation, and looked inquiringly over the table, but no glimpse of a flower was to be seen. Only a dish of luscious strawberries, to which Mrs. Winter helped them, saying, "Allow me to introduce you to one of your rose's first cousins."

"Very glad to eat you," laughed Madge, as she received the saucer. "It is not civilized to devour one's acquaintances, but I feel much like a cannibal just now."

"So do I," said May.

"We have a happy group of cousins in this family," said Mrs. Winter, "coming early when springtime comes, the raspberry, dewberry, thimbleberry —" "And the plum?" asked Madge.

"The plum belongs to the family, but not to the rose division; we will call it second cousin. It gives its own name, prunus, to the first of the three divisions, and with it are the cherry, peach, apricot, and nectarine."

"Well," said Madge, "they are second cousins to be proud of."

"One of these cousins, the wild cherry, or cherry laurel, is not eatable

Blossom of the Peach.

because of so much prussic acid in its fruit."

"I have tasted them, mother, and I have seen little birds eat them."

"Yes, and sometimes they fall over in a

drunken state, just as men do who poison themselves with liquor. All this division have some of the prussic acid in the leaves or in the kernel of the seed. And all the rose division have astringent roots."

"What is that?"

"A property like that in alum, only in a less degree."

"Did you say there were three divisions?"

"Yes, the pear is the third."

"That's a nice one," said Madge.

"You will like it better when you know its nearest kin," said Aunt Mary.

"What are they?"

"The apple, quince, hawthorn, etc. I put the apple first of all fruits: in the first place, because it is good; in the second place, because I get it all the year; I can even eat it green."

"But, Aunt Mary, how do we know these are all kin?"

THE HAWTHORN.

"First, by the leaves; look at one from a rose bush and one from a quince tree. What do you find at the base of the leaf?"

"Two little green blades; in the rose they are joined on to the leaf-stock, but they are separate in the quince. Are they leaves?"

"No; they never make leaves, and are called stipules. All the Rose family have them. Now hold a leaf up to the light. See how full of little veins, and how they branch out again and again, and cross each other in a complete net-work. So with all the leaves of this family; they are netted-veined. Now examine the bark of your apple or quince. You will find it grows in layers, one layer added each year to the outside; so they are exogenous. What does that word mean, Madge?"

"Outside growers, I think."

"Yes; now look at the flowers. All

of this family have regular flowers — four or five petals of the same shape. Then examine the buds. You find the petals curiously folded; two petals entirely overlap the others, two are entirely under the others, and two have one edge over and one edge under. Great families have sometimes their coat of arms or family badge. So you may draw for this great plant family a coat of arms which will show these distinguishing marks."

"Oh, yes, mother! I'll draw a quince leaf with its stipules and netted veins, and a little block from the trunk of an apple tree where I can see how it grows in layers, and — what else? Oh, yes! a flower from grandmother's Sweetbriar, with its five petals and many stamens; or a wild rose would do just as well. What a pretty coat of arms!"

CHAPTER III.

THE COMPOSITE FAMILY; OR, THE DANDELION RELATIONS.

"WELL, May, I've promised grandmother to try it a week."

"Try what, Madge?"

"Why, to talk about flowers instead of girls."

"I'm glad of it. I love flowers better than anything."

"Grandmother was right, no doubt," said Madge, "but it is dreadful hard not to tell what one girl says about another. Why, we can't even 'trade compliments'; and as to talking about those tame flowers instead of spicy girls, it will take all the fun out of life. Just look at that dandelion! What could one say about that?

Poor bright-eyed little thing; it wouldn't be any the worse if I ate it up."

"As you did several of its budding brothers and sisters at dinner about two hours ago."

Madge laughed as she answered her mother, who sat sewing just inside the window. "Well, mother, they will not be missed from such a numerous family; they should be embroidered on the flag of our country, for they grow from Maine to Texas, do they not?"

"Yes, and no wonder, with their locomotive advantages."

"How is that?"

"Their feathery balls of seed float far and wide — a breath of air wafts them along — and when they fall, the bearded, pointed ends of the seed are pushed into the ground by the light pappus which keeps waving to and fro."

"Aunt Mary," said May, "where did

THE OX-EYE DAISY.

the little plant get its name? I don't think it is much of a dandy or a lion either."

"The name came from the leaf. Bring me one, Madge."

Madge rushed after the leaf and came in, saying, "Oh, what ugly teeth-like edges!"

"These 'ugly teeth,' as you call them, reminded some old botanist of a lion's tooth, hence the name in Latin — *dens leonis*, which we have gradually changed to dandelion. Its botanical name, taraxicum, is used only in medicine."

"I did not know that medicine could be made of it," and Madge's nose went up, with evident determination to snub the flower henceforward.

"The root is the medicinal part," said her mother, "but you must not give up the little flower because of that; many of its relations have healing properties."

"What relations has it?"

"At least nine thousand. Your common little dandelion belongs to the largest plant family in the world. One-tenth of all the flowering plants on the globe claim kin with it; they are all 'Composites,' that is the family name."

"Please tell me some of dandy's kinsfolk."

"The little English daisy is first cousin; so are all the asters, marigolds, coreopsis, dahlias, the great sunflowers, bright golden-rods, and ageratums. Some of the cousins belong to the royal family, and some are beggars."

"How is that, mother?"

"What is the royal flower of Scotland?" asked her mother.

"The thistle, the thistle," said both girls in chorus.

"And what is the royal flower of Germany?"

THE DWARF THISTLE.

"Is it the corn-flower?" asked Madge.

"Yes; that was the old Emperor Wil-

liam's favorite of all flowers. And what is the royal flower of Japan?"

"Oh, we know that, don't we, May? the chrysanthemums have been all the rage here."

"Well," said her mother, "they are all composites — asterworts they are sometimes called, and all are cousins to the modest little dandelion. Crowned heads as they are, they grow just as willingly beside little dandelion as in any other place."

"But what beggar cousins has little lion-tooth?" asked Madge.

"The beggar-ticks or bur-marigolds; you know how they cling to your dress."

"The hateful things. I can't enjoy running through the fields, or gathering the golden-rod from the branch, for those beggar-ticks. I wouldn't claim kin if I were dandy."

"The ragweed is another poor relation."

Golden Rod (and Phlox).

"What! that miserable weed which the cows eat and spoil the milk?"

"Yes, the very same; and there is the hogweed and bitterweed, and the cocklebur, and Spanish needle."

"Well, dandy, you are in poor company. I hope there are some good enough to make up for these."

"You will find some useful ones in the garden — the salsify, lettuce, and artichoke. Some others yield valuable medicine — arnica, camomile, elecampane, tansy, and boneset for teas, and colt's-foot for coughs. One innocent little cousin is used to flavor absinthe, a French liqueur, and so loses its pretty name, artemesia, being now better known as wormwood. The Persian insect powder is made of the dried flowers of the chrysanthemum roseum."

"What a difference in the members of one family. I don't see how the dear lit-

tle English daisy can be kin to the coarse sunflower, or the Scotch thistle related to the blue corn-flower and chrysanthemums. It seems to me that they are no more alike than the nations they represent."

"Yet, my daughter, they are all alike in some important points, the flowers and seed being constructed on the same plan. First, all have compound flowers, that is, many little flowers form one head; second, the flower head is surrounded by a set of bracts, or green leaflets; third, there are as many stamens as divisions in the corolla, almost always five; fourth, the stamens are united into one by their anthers or heads."

"Now, mother, I will make the family coat of arms, and little dandy shall represent the compound flowers. It will be quite an honor to represent nine thousand plants."

"Yes, indeed; and there are six hun-

COLT'S-FOOT (AND BLACKTHORN).

dred species in the United States, nearly all herbs. In Chili they are bushes, in St. Helena they are trees. Of late years the chrysanthemums and immortelles are most cultivated, blooming when all the composite cousins are taking their winter rest. Loveliest and latest of all comes the chrysanthemum. Its flowers of purple and yellow and purest white, blooming amid December's frosts, have given rise to a legend thus written in verse: —

"'And it is told in stories old,
That this fair blossom first
On that blest morn, when Christ was born,
Into white beauty burst.
Perhaps — ah, well! we cannot tell,
If it be truly so:
I but repeat the legend sweet,
And only this I know —
That in the prime of Christmas time
The Christ's sweet flowers blow.'"

"That is a sweet verse, mother. I be-

gin to have more respect for little dandelion when I find it has such lovely relations. As to the 'country cousins,' they may be useful in their place. In a family of nine thousand no wonder there are some 'black sheep.'"

CHAPTER IV.

THE PULSE FAMILY.

MADGE and Cousin May had their heads together, talking girl-fashion in mysterious whispers over something immensely important. Madge jumped up and ran to her mother, saying: "Mother, we want you to give us pulse for dinner every day. Will you?"

"Yes," said Mrs. Winter. "Why do you want pulse?"

"Oh, we will tell you after ten days!" Then followed various winks and pinches and cautions not to tell, and from that time until dinner hour, glances at the clock, which they had serious doubts was moving at all.

All things come to those who wait, even

impatiently; so did the dinner, and the girls watched with eager eyes as the covers were removed. When the last one was lifted they turned, disappointed, with questioning glances toward Mrs. Winter, who said: "Send your plates; I will help you to the pulse."

Madge lifted hers with puzzled look, and when she saw only a generous spoonful of peas and one of beans deposited thereon, exclaimed: "You don't call peas and beans pulse, do you, mother?"

"Yes; why not?"

The girls looked chagrined. They had been reading the story of "Daniel," and full of faith in everything he did, determined to try his recipe for good looks.

"Why," said Madge, "Daniel and his two friends ate pulse for ten days, and at the end of that time were fairer of countenance than any other princes; but I thought 'pulse' was some delightful and delicate food."

KIDNEY-BEAN FLOWER.

"No doubt Daniel found it good," said her mother; "he had been all his life accustomed to simple food and pure water, and knew well that it was better for him. Pulse is a name given to several kinds of nutritious and wholesome food."

"Is 'pulse' a family name?" asked May, remembering their talk about the Composite family to which little dandelion belonged.

"Yes, that is the common family name, though botanists call it *leguminosæ*."

"What does that mean?"

"Bearing seed in a legume — a pod which opens on both sides, like the pea or bean."

"Is it as large a family as the composite? What is the coat of arms?"

"One question at a time, Madge. It is a large family; at least sixty-five hundred species claim kin, having the same coat of arms which is this: all bear legumes;

all have compound leaves, that is a number of leaflets arranged on each side the leaf-stalk. Each one of the sixty-five hundred species have these two marks, and so claim kin. Quite a family tree you can make of them; a very remarkable tree it would be, bearing flowers, fruits, gums, drugs, and perfumes, yet none more useful to man than the pulse which Daniel ate."

The slightest possible rise in Madge's nose indicated her opinion of Daniel's taste; but little May wanted to know more about the Pulse family, so that she could recognize any member that might nod to her from the garden or roadside, or peep at her through the sedges.

"There are three divisions to this family," said Mrs. Winter; "the pulse, brasaletto, and mimosa. The first is the largest, and you may know a member of that division by the shape of the flower, which is papilionaceous."

"Dear me, what a name!"

And May looked as if somebody ought to apologize, or be reported for cruelty to animals.

But Mrs. Winter, always ready to help over hard places, said: "An old man named Linnæus, who loved flowers just as you do, and learned much about them, fancied that these flowers resembled a butterfly, so he gave them that long name."

"Oh, yes!" Madge exclaimed. "I know papilio is the Latin for butterfly; the pea and bean flowers do look like butterflies."

"Well, do you know any others?"

The girls thought a moment. May spoke first.

"Wistaria," said she, her face brightening with the remembrance of her favorite, blooming so early in large, graceful clusters of lilac flowers.

"Then there is the sweet pea and acacia and locust, all have butterfly flowers —"

"Papilionaceous," interrupted Madge. May laughed and repeated the word, this time without difficulty, and then she continued: —

"I saw this morning a wild vine creeping close to the ground and having large lilac papilionaceous blossoms. Does that belong to the family?"

"Yes; that is the butterfly pea, one of the country cousins."

"Do we have any fruits in this family?" asked Madge.

"There is the tamarind, a fine-flavored fruit, but as it does not grow in the United States you know little about it. And there is the ground pea, with which you have at least an eating acquaintance."

"Oh, yes; how nice the hot parched peas are, and better still in candy. I have seen it in bloom on grandpa's farm; but where were the peas? they do not hang on the vine."

Branch and Flower of Robinia Pseud-Acacia.

"The peas grow in the ground, hence the name. Do you know, Madge, that your pet cow likes pulse as well as you do?"

"What member of the family does Daisy feed on?"

"There she is now, in a field of pulse. Clover and lucerne are as good for her as pulse was for Daniel."

"I love to watch her enjoy it. She chews it over and over as I do gum."

"Well, I hope you will retire to the field with Daisy whenever you must chew gum. Perhaps you will think more of the Pulse family if I tell you that it furnishes some of your gum. Gum tolu, for instance, and its cousin, gum arabic, are one of the acacias. Then there are copavia, tragacanth, Senegal, and kino, besides such drugs and dyes as licorice, catechu, senna, indigo, logwood, camwood, and Brazilwood, and for perfume there is the Tonga bean."

"Do all the family have flowers of the butterfly shape?"

"No; the flowers are very different in the third division, the mimosa."

"Why, that is grandmother's favorite tree!" exclaimed Madge. "The shaded rose-pink flowers are like pompons of silk, with delicate perfume; and then, mother, the leaves are sensitive. I have many a time slipped up quietly and touched one just as gently as possible, but the leaflets would instantly fold themselves up as if afraid I would hurt them."

"Yes, I have, too," added May; "and out in the fields I have often seen running over the weeds a briery little vine covered with dainty little pompons of the same kind of flowers, and with leaves so sensitive that they close if your dress barely brushes them."

"That is the common sensitive plant. Is it of the same family?" asked Madge.

"Yes," said her mother.

"Isn't it funny to think the big tree and little vine are cousins! — a giant and a dwarf."

"There are many curious plant cousins. The name of this division of the family tree is mimosa, meaning 'to mimic'; so named by some one who fancied that in these movements the plants imitated animal life. If you were to go to Aspinwall, and step from the car into a patch of mimosas, you would be startled. The whole patch would disappear, or seem to, so closely and suddenly do they shut up their leaves. But they open again as soon as you move away. In India, on the Ganges, you may find a mimosa called the 'moving plant.' All day the leaflets move, up and down, from side to side, or in circles, without ceasing, and when there is not a zephyr to stir them — at night they sleep."

"Do all plants sleep, aunt?"

"They seem to, May, but all do not close their leaves. One kind of locust droops down its leaves, while the honey locust raises them upright; and they do not, like the birds, go to bed with the sun. One little sensitive plant folds its leaves and goes to rest before sunset, and opens again before sunrise. Now, can you remember in what all the plants of this family agree, so that we may know them by their coat of arms?"

"Oh, yes!" said May, "the seeds are in a legume. I'll draw an open pea-pod to represent that, and the leaves are compound. We can sketch a little sensitive plant with the tiny leaflets on each side a leaf-stalk, to show that mark."

"Or grandmother's mimosa tree," said Madge; "and then, mother, let us have the flower from our sweet-pea vine, to show the butterfly — I mean the papilionaceous form of the pulse division of the

family. Have the *leguminosæ* no royal flower among the sixty-five hundred species ? "

" Long ago," said her mother, " history recorded the fact that for some crime the first earl of Anjou made a pilgrimage to Rome, and was there scourged with twigs of broom, or *planta genista.* Henceforward the humble plant was painted on the shields of the house of Anjou, and Henry II., being the first of that house to rule in England, bore it on his escutcheon, and from that received his name, Plantagenet. Fourteen kings bore the same coat of arms, so I think you may count the humble genista of the Pulse family as a royal plant."

CHAPTER V.

THE OAK FAMILY.

HALF a dozen young girls were gathered around Aunt Mary, to eat her cakes and hear her stories. The cakes were wholesome, and the stories sure to be seasoned with stray bits of advice; but the girls believed in Aunt Mary thoroughly, and caught some of her enthusiasm, even when she forgot her story and strayed off on some study of nature. So it happened on this occasion, which was a bright October afternoon, and they were all picnicking under the oaks of "Forest Hill." Now and again, as a breeze stirred the branches, an acorn dropped, and May — "hazel-eyed May," the girls called her — ran to secure, and, of course, to examine it, asking, as she

The Oak.

returned, "Is this the fruit of that great tree, Aunt Mary?"

"Yes," said her aunt.

"Well, I never saw any flower on an oak tree, did you, girls?"

The girls thought not, except Madge, who remembered some tassel-like clusters hanging from the branches in the spring.

"Yes; those were flowers," said Aunt Mary, "or a number of flowers together, called a "catkin." The tree has two kinds: those in the catkins are staminate flowers; the pistillate flowers are separate, not more than one or two in a place, and surrounded by little scales, which finally form this acorn cup. The acorn itself is the ripened germ of the pistil."

"It isn't good to eat, is it?"

"Taste and see."

And so the little investigator did; but a wry face and vigorous spitting soon answered her question.

"Yet," said Aunt Mary, "acorns are sometimes used for food, even in this country. Indians in the far West grind the kernel into meal, wash it to extract the bitter, dry it in the sun, and make bread of it. In the Asiatic country of Kurdistan is an oak from which a sweet sap drips and hardens into small grains, which the natives use for sugar; 'oak manna' it is sometimes called. Centuries ago the Saxons valued the oaks of England, not so much for the timber as for the acorns, on which they fattened their hogs. 'Mast,' they called the acorn food, and even now we hear the great Oak family sometimes spoken of as the 'mastworts.' The right of feeding hogs in the oak forests was called by the Saxons 'pannage,' and was considered so valuable that monasteries were endowed with the right, and it was also given to kings' daughters as part of their dowry."

"Perhaps that was the reason they were so angry with William the Conqueror when he took the 'New Forest' for a hunting-ground," said one of the older girls.

"Yes; and can you tell us anything of English oaks farther back than that time?"

Madge thought a moment, and said slowly, "I remember something about the Druids. Did they worship this tree?"

"They considered it sacred, and worshipped always in oak forests; indeed, the name Druid possibly comes from the Celtic 'der,' an oak. But the mistletoe, which was often found on its branches, was the object of their peculiar veneration. When a branch of it was found, they assembled around the oak with banquet and song. A white-robed priest cut the mistletoe with a golden sickle; two other white-robed priests held a white cloak to

catch the sacred plant as it fell; and two white heifers were sacrificed with joy and feasting. The plant was cut into pieces,

Branch of Mistletoe.

divided among the worshippers, who wore it as a charm to protect from all evil."

"There's a bunch of it now," said one of

the group, "but it's too high to see if there are any berries. Is it good for anything?"

"It is more beautiful than useful, as are all parasites," said Aunt Mary.

"What are parasites?" questioned May.

"Plants which grow upon other plants — live on the labors of others. People do that sometimes, and the world has very little use for them."

"We found a hard, round ball growing on a small oak; what was that, Aunt Mary?"

"Probably a species of oak-gall. A gall-fly pierces the bark with her sharp bill, deposits her eggs there, and with them a poisonous fluid which forms the gall — a kind of vegetable tumor, we may call it. These galls are useless. The real gall-nuts are found in Asia, and are all sizes, from a pea to a large cherry. The 'tannic acid' within them is used in mak-

ing ink. The best galls are blue, green, or black, and collected before the eggs are hatched. Those taken afterward are white, and are of inferior quality."

"Are the pretty green and pink balls

Oak Leaves and Apples.

which we find in spring on oak branches a kind of gall?"

"No; they are commonly called oak apples, and said to appear about Easter on

the tender twigs or leaves of the common oak. They are very pretty, but the spongy, paper-like ball is entirely useless."

"Is the tannic acid of the gall-nuts what they use in tanning leather?" asked one of the girls.

"No, dear," said Aunt Mary; "the bark furnishes the materials for tanning, besides giving us the bright yellow dye, quer-citron. One specie of oak in Arabia is found covered with kermes — insects which, like the cochineal, make a fine red dye."

Little Daisy wanted to know which of all the Oak family was the prettiest, and her aunt said: —

"The live oak, so valuable for ship-building, is said to be the handsomest, because of its glossy, evergreen leaves; but these grand spreading trees above us are fine indeed."

"You may now add to your list of useful products obtained from the oak, another of which you think very highly."

"What is that?" asked all the girls in chorus.

Aunt Mary pointed to one of their tennis rackets lying near.

"Why, that is not oak, is it? the handle I know is cork," said Madge.

"And cork is the bark of an oak tree which grows in Spain and countries near. They begin barking the tree when fifteen years old, and repeat the process every ten years."

"Does it not kill the tree, Aunt Mary?"

"No; it is said to make it grow more vigorously; a barked tree lives about one hundred and fifty years. Your life preservers, cork jackets, cork soles, corks for bottles, and a thousand things come from the cork oak. 'Light as a cork,' we say, and yet twelve thousand tons of this useful bark are cut annually."

"Well," said May, "I believe the Oak family is nearly as useful as any we have found; is it not, Aunt Mary?"

"Yes; if you remember that we have among the nearest kin the beeches and hazelnuts and chestnuts and chinquapins."

BRANCH OF THE BEECH.

"Not the nice chestnuts we buy from our grocer, Aunt Mary?"

"Yes; there are many in this country,

but the finest come from the south of Europe, where they form the vegetable diet of the peasantry. Remember the rhyme, —

"'For chestnuts roasted by a gentle heat,
No city can the learned Naples beat.'

"The school boys and girls of some of our southern states will tell you what fun it is to go hunting chinquapins. The opening of the burrs is rather prickly fun sometimes, but they manage to gather baskets full, and the girls string the glossy, bead-like nuts, and cover themselves with as many necklaces as an Indian princess. All this family of shrubs and trees have deciduous stipules."

"What does deciduous mean?" said May. "I know that a stipule is a kind of make-believe leaf which sometimes grows at the base of the larger real leaves."

"Yes; and when stipules fall early, before the leaves do, they are 'deciduous.'

Then all this family have leaves growing alternately on the stems, and with straight veins. The flowers are without petals and monœcious, that is, two kinds on one tree, and the staminate flowers are in catkins. The fruit is a nut enclosed in a cup or sac."

"Aunt Mary, did not the old Greeks prize the oak very much?"

"Yes; and made it an emblem of hospitality. But the Romans went further. A chaplet of oak leaves was given as the 'corona civica,' and to obtain it, it was necessary to be a citizen, to slay an enemy, to save the life of a Roman, or to reconquer a field of battle. The Germans love better the beech, 'Buch,' they call it, and our word book comes from it, since the sides of large books were formerly made of beech. The tree is said to be so rarely struck by lightning that woodmen seek its shelter during thunder storms."

Daisy thought she liked the chestnut best of all the family, and wanted to know if they were not so large as the oak or beech.

"Some of the oldest and largest trees are chestnuts," said her aunt. "On Mount Etna is a grand old tree. In the hollow trunk, which is one hundred and sixty feet in circumference, shepherds and their flocks often take refuge. It is spoken of as the 'hundred horse-chestnut,' because of a tradition that Joanna of Aragon once visited it with all the nobility of Catania, and that all found protection beneath its branches."

"But oaks seem to have made the best hiding-places, Aunt Mary," said Madge. "I remember the 'royal oak,' where King Charles hid among its boughs."

"Yes," exclaimed May; "and I know the 'charter oak' at Hartford."

Another bright-eyed girl had read of

The Chestnut Tree of Mount Etna.

the "oak of Torwood," in whose hollow trunk William Wallace found refuge.

"Three cheers for the Oak family," said Aunt Mary; then at her suggestion, they all agreed to plant each year some member of it, and Daisy declared her intention to "plant a chestnut every time."

CHAPTER VI.

THE MALLOW FAMILY.

Little Daisy sat perched in a great arm chair, puzzling her brain over the morning paper. It must be interesting, or father would not pore over it so long when she was aching to talk to him; but somehow she could not find the "story part," or anything that attracted her attention, except three words printed in large letters — "Cotton is King," so she laid aside the paper, saying, "Aunt Mary, who is King Cotton? I never heard of him before."

"Didn't you, Daisy? Well, come with me and I'll show you one of his family."

"Why, auntie, kings don't live in this country."

"No; but sometimes we take care of a stray twig of royalty."

Then Mrs. Winter carefully rolled up her knitting and went out to her flower beds. Daisy followed until she paused in front of a coarse plant, saying, "Not a very fine king, is it, Daisy?"

"Now, auntie, that is nothing but a stalk of okra, and I have been wondering why you had it among your pretty flowers."

"No, child, it is not okra, but a near relative — second cousin, I believe. It is cotton, and I did put it here because I love to see the plant which filled so many of the fields around my old home. It resembles okra, and no wonder, for they both belong to the Mallow family."

"O auntie! Are they kin to the marsh mallows? — but I forgot; marsh mallows are candy and not plants."

"You are not far wrong, Daisy; the marsh mallow paste to which you are so partial is made of the root of one of the family — a species known as *Althea offi-*

cinalis. Is that name too long to remember?"

"No, auntie, because I know the first part, Althea, so well. That is the name of your favorite tree down by the lake, which you told me was sometimes called the rose of Sharon. It is a pretty tree, and has a pretty name, I think."

"Yes, and a good one, for Althea means to cure."

"Does it cure anything?"

"Yes; the root of one species is full of mucilage, which is said to make an excellent poultice. But I believe the poultices are not made from my shrubby Althea, but from a smaller mallow."

"Do I know any other mallow, Aunt Mary?"

"Yes; there is your bright hollyhock in the garden — the *Althea rosea* — and the creeping dwarf mallow, with its flat, circular fruit, which you children called

'cheeses'; and over there among my flowers, is the hibiscus."

"Oh, yes; but I don't like that, for the flowers bloom only one day."

"Then you would not like its cousin, *hibiscus tritonum*, or 'flower of an hour,' which blooms only in midday sunshine. One kind has flowers a foot broad, and there is in the East Indies a species whose bright scarlet flowers stain black, and are used to black shoes. The one you know best is the okra."

"Oh, yes, I like that; but have all the mallows such coarse flowers?"

"Yes, most of them; but here is the abutilon or Indian mallow, with its pretty bells hanging by hundreds; that is not coarse. One good thing is said of the Mallow family."

"What is that?"

"Not one has any unwholesome quality. All abound in mucilage, and most of them

have a fibrous or stringy bark, which makes good fibre for paper. You know the saying, 'pretty is as pretty does,' and no plant family does more work for the world than the mallows."

"How can plants work, auntie?"

"By furnishing materials for us to work with. This one member of the mallow connection, this ugly cotton, gives employment to so many thousands of men, women, and children, and so controls the world's markets, that people sometimes call it 'King Cotton.'"

"I think linen or silk should have the title; it is far more beautiful, and kings wear it more."

"Possibly so, but neither linen nor silk do so much for the world. Cotton well earns its title."

"I should like to see the cotton in bloom, Aunt Mary."

"Well, here is a pink blossom, and under these leaves a white one."

Common Mallow.

"Why, I thought the white cotton was the blossom!"

"No; the blossom as well as the leaf is something like okra. That pink blossom is older than the other. They come out pale yellow or white and turn pink."

"Well, auntie, how can one always know a mallow? What is the coat of arms of this royal family?"

"You may know them, first, by the stamens, which have their tiny stems, or filaments, united into a single tube, and they grow on the base of the petals. Second, you know them by the leaves, which do not grow opposite each other on the stems but one above the other, alternately, and are palmately veined, the small veins in the leaves running out like fingers from the palm of your hand. Third, they all have five petals and five sepals."

"What are petals and sepals?"

"Each tiny leaf of the flower is called a petal; each leaf of the green calyx under the flower is a sepal. Lastly, the bark of all the mallows is a tough fibre and the plant is full of mucilage. Now can you repeat the coat of arms?"

"Let me see, auntie — many stamens united in a tube; leaves not opposite but alternate; five petals and five sepals; tough, stringy bark, and mucilage in the plant — like okra, you know. But, grandma, if the cotton is not the bloom, what is it?"

"Cotton is a fine hair-covering for the seed. The mallows are very downy, hairy plants, and in the cotton plant the hair is so long and so abundant that when the seed pods burst there is a field of snowflakes."

"I'd like to be a cotton-picker. It would be great fun, wouldn't it, auntie?"

"Yes, for half an hour; after that your back would give notice to quit. Yet some

THE COTTON PLANT (species found in Eastern Countries).

women on our farm used to pick out their hundred pounds a day."

"Was it ready to spin then?"

"No; it must be ginned."

"What is that?"

"That is getting the cotton off from the seed. A hundred years ago it was done with the fingers. Very slow work it was. It was counted a good task for a long winter evening to pick out a shoe full of seed."

"Then, auntie, how did the factories ever get enough?"

"There were no factories then; spinning and weaving was done by hand. Cotton was rare and dear. A ship with eight bales on board was seized by the English, because they declared that the whole of the United States could not raise so much, and, therefore, it must have come from India, and belonged to them.

"Some day I hope you may see a ginnery. Wagon-loads of cotton are driven under the great fan tubes, and the white flakes are sucked up to the top of the

building, where machines tear the cotton from the seed, pack it in bales, and bind it with iron ties ready to be sent to the world's factories. Then they card, and spin, and weave, and dye, and stamp it, and you may have a pretty calico, gingham, sateen, or muslin — all made of cotton, — besides thousands of other useful things."

"What do they do with the seed, — throw it away?"

"When I was young, Daisy, they did nothing with it but throw it over the fields, but now the cotton-seed oil-mills use every part. A fine lint is left on the seed; that is scraped off by a machine, which also cards it into wadding for comforts and such purposes. Then the oil is pressed out of the seed, and so well refined that only experts can tell it from pure olive oil. The crushed seed are not yet thrown away, but ground into a fine meal for cows, all except the hulls, which are

fed to cattle, or used to make fertilizers. I have known the engine of an oil-mill to be run when using only the hulls for fuel. Not one thing is lost."

"What did the world do without cotton, Aunt Mary?"

"Oh, they used flax and many other fibrous materials, but the world has used cotton a long time, only in smaller quantities. The old historian Herodotus speaks of using cotton several hundred years before our Saviour was born. We read that Cæsar covered the forum and the 'sacred way' with awnings made of cotton, and thousands flocked to see the curious fabric. In eastern countries they were most skilful in weaving by hand the beautiful cotton cloths. Look for 'Dacca' in your geography, and then remember that as the city where they could scarcely find names beautiful enough to describe their fabrics, and stamped them 'Abra-

wan,' or flowing water; 'Shabnam,' the evening dew; and 'Webs of woven wind.'"

"Well, auntie, this Mallow family is worth knowing. I'll think more of your cotton plant. You said that one hundred years ago the United States raised only about eight bales a year; how much is made now?"

"If you multiply that number by one million, it will hardly exceed the crop this year."

"Why, auntie, that would make cloth enough to wrap around the whole world, wouldn't it?"

"Perhaps so. The eight million bales is about two billion pounds, and one pound will make six yards of muslin. How large a sphere would that cover? Ask brother John to make the calculation."

CHAPTER VII.

THE PINE FAMILY.

"AUNT MARY, please tell us about another plant family this morning. Madge and Daisy say they are willing."

"Well, my little botanist, run out for a walk first, and bring me a basket of pine cones from the woods; perhaps we can make something pretty."

The ramble was pleasant through the forest of Georgia pines, with their soft carpet of straw, and fragrant odors, and the girls were too busy picking up the finest cones to be disturbed by what some called the "sad sighing" of the pines.

Aunt Mary was quite satisfied with their selection, and they watched her with interest as she arranged the cones into a

A Grove of Pine Trees.

picturesque hanging basket, planting seed within each little scale. How pretty it would be with the bright green blades springing from the upper ones and the maurandia trailing below!

As usual, May wanted to know all about the cones, or "burrs" as she called them, and was glad to learn that the tree which bore them gave its own name to a large family connection. "For," said Aunt Mary, "the true Pine family are all conifers."

"How do they class them?" asked Madge; "they have no flowers to examine."

"A botanist looks closer than you do," replied her aunt. "He finds two kinds of flowers; one, having only stamens, forms a reddish cluster around the young spring shoots, and the young cones have under each scale a pistillate flower. Pull off a scale from one of these cones and you will

find what was a pistillate flower ripened into a two-winged seed."

"Are two kinds of flowers on the same tree?"

"Yes; botanists call them 'monœcious,' which means, in one household."

"Well, I never did take them for flowers, Aunt Mary."

"No; for they have neither corolla nor calyx."

"Why," said May, "I thought it took a corolla and calyx to be a flower."

"No," replied her aunt; "botanists call anything a flower which has stamens and pistils."

"Then they don't add much to the beauty of the world," Madge remarked in rather a criticising tone.

"Let us see what this Pine family is good for, before we decide," said Aunt Mary. "Do you not admire the curled pine with which your room is finished?"

FRAGMENT OF A PINE BRANCH.

"Will these trees make curled pine?"

"Certainly, and a thousand other things. Some of them grow straight up for more than seventy feet without a branch, furnishing tall masts for our ships."

"Oh, yes!" said Daisy, "my geography says that the mountain forests of Maine grow pine trees for ship building."

"Yes; some of the Pine family love the mountains. Their botanical name, *Pinus*, is near kin to the Celtic word *Pin*, which means a mountain. From the Atlantic to the Pacific you will find some species of this family growing on the mountains. But these southern forests furnish the tar, pitch, and turpentine, besides immense quantities of lumber for building."

"Aunt Mary, are cedars kin to pines?"

"Oh, yes, Daisy! very close kin."

"First cousin, I guess," said the little girl, "and my pencil is made of red cedar."

"Mother keeps her woollens in a cedar

chest," added May, "and we have a cedar closet and cedar pails, and — oh, I don't know how many things made of cedar!"

"Can you tell me, Madge," said her mother, "what a beautiful house was made of cedar?"

Madge brightened as she answered: "The Temple of Solomon was made of

CONES OF CEDAR OF LEBANON.

the cedars of Lebanon, and fir trees, and almug trees. What are the two last, aunt?"

"They are species of the pine. The almug belongs to the cypress division, and was used to make musical instruments for the temple. Historians tell us that eighty

THE ENGLISH YEW.

thousand men were employed as 'hewers on the mountains' to get these trees for building the house of the Lord."

"I read the other day," said Madge, "that the temples of Japan were almost hidden by these evergreens, because the priests never allow one cut down or even trimmed. Do we know any conifers besides the pines and cedars?" she added, growing more interested.

"There are three divisions to the family, the pine, cypress, and yew, and each division has a number of species."

"Where do the yew trees grow?"

"Not well in this country; but history tells of yew trees in England growing to great age, so that they became emblems of immortality, and were planted mostly in church-yards. The famous English bow was made of yew, because the wood was so tough. The leaves are poisonous to men and animals, and insects never attack it.

Then we have the hemlock, with its tannic acid used in tanning leather; the balsam pine."

"Oh, yes, Aunt Mary!" exclaimed Daisy; "that's the pine we run to when we cut our fingers; we just stick a knife into one of the little blisters, and the sap that runs out will cure it up quicker than anything."

"Yes, I know; and there is the Canada balsam, which some call the balm of Gilead."

"The larches are evergreens. Do they belong to the Pine family?" asked Madge.

"Yes; but they grow best in Europe. The most noted are in Scotland. On the estates of the Duke of Athol ten thousand acres are planted in larches, numbering, it is said, fourteen million trees. The wood of the fir tree is most durable. Houses built of it three hundred years ago show no signs of decay."

REDWOOD TREE.

"Where do pines grow best?"

"Possibly in the West, where there is a great variety. The redwood you admire grows in the West."

"Ah, yes; my desk and chair are redwood, but I had no idea it was even distant kin to the curled pine of my mantel and doors."

"Yes; but the wood, though light and beautiful, is not very strong. There is in California a curious cousin called the sugar-pine, whose sap is sweet, and is used in place of sugar by the poorest classes; and in Mexico you will find a nut pine. The Mexicans call the nuts *piñones*, and eat them as we do ground peas. Last and largest of all this useful family, we must remember the gigantic trees of California."

"O Aunt Mary, are they pines?" all the girls exclaimed at once.

"Yes; they belong to the cypress division. The great trees of the Calaveras

group are known botanically as *Sequoia gigantea*, or giant redwood."

Daisy brought her geography to show a picture of these immense trees, which were some of them thirty-six feet in diameter, with bark more than a foot in thickness, and four hundred and fifty feet high, and more than a thousand years old.

"How could one tell the age?" asked May.

"By counting the rings in a section of the trunk which has been sawed off — a ring is added each year. The new ring grows next to the bark."

"One more question, Aunt Mary," said May. "How can we know the members of the Pine family?"

"They are trees or shrubs with resinous juice. The leaves are evergreen, and needle or awl shaped. The flowers are monœcious, and have neither corolla or calyx. The buds are scaly; the seeds are

two-winged. Should you go to the great fair in Chicago in 1892, you may see one of these great trees, for they propose to cut one in sections and set it up there, so that the world may see this giant tree of the Pine family."

CHAPTER VIII.

THE LILY FAMILY.

FOUR girls sat on the steps of the broad piazza with heads bent over, eagerly examining some tiny object, when their good genius, Aunt Mary, passed by on the way to her flower beds. "What now, girls?" she asked.

"Oh, Aunt Mary, I'd give my head for a microscope," exclaimed one, without looking up.

"That's Kate, I know," said her aunt; "no one else has always so many heads to dispose of; but what would you do with a microscope?"

"Find out whether this plant belongs to the Lily family. You know a prize is offered to the one who brings the greatest number of specimens from the *Liliaceæ*."

"No, I did not know it; but since your object is a good one, I will furnish the microscope. Look in my desk; right hand upper drawer."

"Oh, thank you, thank you;" and Kate

PETALOID COROLLA OF THE LILY.

was gone, to return in a minute with the coveted glass. Then the heads came together again. A close examination decided the disputed point, while Aunt Mary

looked on with interest, remarking, "What a pretty perianth, shaded green, lined with soft bright white."

"What do you mean by the perianth?" asked Bessie.

"The flower leaves are called the perianth when there is no separate corolla and calyx, but all in one, as in one large white lily."

"Well," said Kate, "our little star of Bethlehem adds another to our list."

"Three other names are sometimes given to your pretty little flower," said Aunt Mary. "In the first place the botanical name is *Ornithogalum*, or 'bird's milk'—a Greek expression for anything marvellous. But our country folk are more exact, and call it 'eleven o'clock lady,' because it opens at that hour. Then it closes at three o'clock, and so gets the comical name of 'Johnny go to bed.'"

The girls laughed, and Kate labelled her specimen "Johnny go to bed, *Ornithogalum.*"

"No wonder the poor little thing looks wilted," said May. "Now, Aunt Mary, give us another one of the lily sisters."

"Out on the lawn there is a group of them, but more like giant brothers than sisters. Botanically they are yucca plants, but their sharp, sword-like leaves give them the names of Spanish bayonet, Adam's needle, or bear's grass."

"Surely, that great, fierce plant isn't kin to this tiny star?"

"Yes; when it blooms you will find the six-parted perianth, six stamens, and three pistils, having a three-celled ovary. It is a true *Lilium.*"

"Why do you say true *Lilium*, Aunt Mary?"

"Because there are five divisions to the Lily family, and the yucca belongs to the

lily division, which is the largest and, perhaps, the most beautiful. There are all the variegated lilies from Japan, which

Lilies of the Valley.

were once so rare that ninety dollars was paid for a single bulb; now you get one for fifty cents. But none are more beauti-

TULIPS.

ful than our pure Easter lilies, nor sweeter than our dear little lily of the valley, which is not confined to the valleys, however, but grows high among the cliffs of the Alleghany Mountains."

"Are the hyacinths members of this family?"

"Yes, even the wild hyacinth, or bluebell of England."

"I love the sweet white Roman hyacinths best," said Madge.

"A story is told in mythology," said Aunt Mary, "of Hyacinth, a youth beloved of Apollo, and by him accidentally killed. The god could not bring to life the youth, but caused his blood to spring from the ground in these white, fragrant flowers. And these gay tulips are lilyworts also. Examine one of the single varieties. See the parallel-veined leaves, the regular flower with its six-parted perianth, and as many stamens. And be

sure to notice the three-celled ovary of the pistil. 'Go to Holland for tulips,' is an old saying. It was in the seventeenth cen-

Bulb of the Lily.

tury that there was such wild speculation there in tulip bulbs. Six thousand dollars was paid for a single rare bulb. The

government finally interfered and limited the price to two hundred francs."

"What are trilliums, Aunt Mary?"

"The name shows that all parts of the plant are in threes, as in the wake robin and Indian cucumber. Even the leaves grow in a whorl of three, around the stem."

"Are there no useful plants in this family?"

"Yes, there are medicinal plants; aloes and squills, and the roots of Solomon's seal; and in Turkey they eat the shoots of the latter as we do asparagus, to which it is a close kin."

"Asparagus is not much like the other members of the family."

"It is much like some with which you are not familiar, the asphodel, for instance. It resembles that except in the fruit. The ancients planted asphodel in their cemeteries, because they believed that the souls of the dead were nourished by its roots.

They dedicated the plant to Proserpine, and strewed the graves of their friends with its pure, white, star-like flowers. Another useful product of the lilyworts is the dragon's blood, used in paints and varnishes; not the life blood of a horrible dragon killed by some St. George, but the harmless red juice of another of this family — the dragon tree of the Canary Islands. One species has a trunk twenty feet in diameter, but the tree is not very high."

"Do we eat any of this connection besides the asparagus?"

"If you like onion, or garlic, or leeks, you do."

"No onions or garlic for me; but what are leeks?"

"Only a mild species of onion. The Scotch could tell you all about them. An old Scotch dish which Sir Walter writes about, was made by stewing an old fowl with leeks; they called it 'cock-a-leekie.'"

Dragon's Blood Tree.

The girls laughed, and asked Aunt Mary for another specimen.

"Your pretty twining smilax is classed by some among the lilies, but the most useful one I know of is found in New Zealand. It is a tough flax tree, resembling the yucca, and the most important of their plants, since they use it for building their houses, and thatch the roofs with the leaves, which are from two to six feet long. They not only build their houses, but furnish with it, making even their plates and dishes, besides mats and nets, and sails for their boats, and fishing-tackle, and baskets, and clothing, and medicine for the sick. The fibre is very tough, and makes good cloth."

"Well," said Kate, "I didn't know the *Liliaceæ* were so useful. If they do not 'toil and spin,' they have some among the relations that furnish plenty of material for us to do the spinning."

CHAPTER IX.

THE GRASS FAMILY.

MADGE came in from among the flowers, washed her hands, bathed her hot face, and as she heard the tea-bell, walked to the dining-room, saying, "I am so tired of this horrid grass that I promised grandma to keep out of her flower beds. What's grass good for, anyway? Now, mother, I know you are going to tell me how my cow likes it, and how I like her milk, but that don't alter the fact that grass is always in the wrong place, and somebody has work to get it out of the way. I believe the world could do very well without the Grass family."

"I know a little girl who would be the first to object if all the Grass family were banished," said Mrs. Winter.

"Try me and see, mother."

"Very well; shall we begin now?"

"Yes, ma'am; as soon as I get my bread and butter."

"Here is the butter, but I cannot give you the bread; it belongs to the large family you want to banish."

"What, mother, this light bread?"

"Certainly; wheat is one of the grasses."

"Well, then, I'll take a muffin."

"Not now; the muffin is made of corn-meal, and corn is another member of the Grass family."

"Dear me, I don't like

COMPOUND SPIKE OF WHEAT.

brown bread, but I'll have to fall back on that."

"No; the brown bread is made of rye flour. I have often heard you admire the fields of rye grass."

Madge's face fell. She was very hungry after her scuffle with the grass among the flowers, and now it seemed the troublesome thing was about to get the best of her, after all. With a doubtful look she handed her plate for a spoonful of rice. But again her mother refused; it was one of the banished grasses.

"Well, mother, you always get the best of me. I'll take back all I said. I begin to think we could not live without grass, but, of course, I did not know such things as wheat and corn were grasses."

"They are the seed or fruit of grass."

"But, mother, they do not look alike. Why do you class them together? What is the coat of arms of this family?"

"In the first place, all these stems are culms, that is, jointed and hollow between the joints. Second, the leaves have open sheaths, enclosing the stem at their base. And they are 'two ranked,' the second leaf coming out half way around the stem above the first, and the third leaf exactly above the first, the fourth above the second, and so on, and all have parallel veins. Third, each flower is enclosed in a glume, or husk. Fourth, they are all endogenous."

CULM OF THE RYE.

THE CULTIVATED OAT.

"That means inside growing," said Madge.

"Yes; there are no layers, but the wood and pith is all mixed in together, as you will see if you cut across a corn-stalk."

"Why, mother, all the bread we eat is made from the Grass family!"

"Yes; and the oat-meal, wheat germ, hominy, grits, barley; and besides that they furnish nearly all the food for cattle. The great loads of hay, the barns full of timothy and orchard grass, all come from your banished family. And there

is one you are especially fond of and drink its juice as readily as Daisy does that from the sweet hay."

"I may chew gum, but I never chew grass stems for their juice, mother."

"How about the sugar-cane?"

"Of course I suck the juice from that. Surely that is not a member of the family?"

"Look at the coat of arms and see."

"Yes; I know it has a jointed stem with wood and pith mixed together. The leaves grow in two ranks, and are parallel-veined, and form a sheath around the stem. Is the root fibrous?"

"Yes; there is no long tap root, and the flowers are enclosed in little, scaly bracts, or glums. This cane is an important one of the grasses. Nearly all the best sugar of the world comes from it. Your candy-shops would have to close, and no more cane-syrup for that sweet tooth of yours. No more pop-corn balls either."

"What, mother, how is that?"

"Only that the sugar comes from the cane, and the pop-corn, like your bread-corn, is first cousin."

"The corn and cane are the largest of the Grass family; are they not, mother?"

"No; there is a distant relative in tropical countries which grows much larger — the bamboo. It runs up from fifty to eighty feet high, and the hollow-jointed stem is ten inches thick — as large as your body. It is a beautiful plant and very useful."

"Do they grind up the seed for bread as we do corn?"

"No; only the young, tender shoots are used for food, but almost everything is made of the stem — houses, water-pipes, umbrellas, fishing-rods, baskets, hats, furniture, ropes, and paper, and so on."

"Oh, yes; and I have seen the walking-canes made of bamboo. Which of all the grasses is the most useful?"

A Harvest Scene in Spain.

"Rice furnishes food to more people than any, for the people of China and India live almost entirely on rice. Corn and wheat are used more in this country."

"Do none of the grasses have pretty flowers?"

"No, perhaps not; but the feathery plumes of the pampas grasses are as beautiful as flowers."

"Why, mother," said Madge, as she made a survey of the table, "not one thing on this tea-table but what is made from the Grass family, except the butter; and I suppose you would tell me that Daisy could not give us that long, if there were no grass. Well, I'll not say anything more against the Grass family, only I wish it bore pretty flowers of its own, and did not take such delight in choking grandmother's."

"The plants that feed the world do not need beautiful flowers to make them valu-

able any more than the great oak and elm and chestnut trees do. And if the grass did not spring up so easily, food would be harder to get. Flowers are a luxury, and all luxuries must be paid for in work or money. When you grow weary of pulling the green blades from among your flowers, you must remember that; and instead of despising the persistent grass, respect it the more because it so freely and abundantly gives itself for the food of the world. Think of a world without this Grass family. The cattle upon a thousand hills would lie down famishing; flowers might blossom, fruits ripen, but without bread, the staff of life is gone, and man would soon lose strength, and hope, and life."

CHAPTER X.

THE MINT FAMILY.

"WHAT are you feeling for, Daisy, in grandmother's pocket?"

"Grandmother's pocket is Daisy's candy store. Look, Frank," said Bessie, as little curly-head drew out one dimpled hand grasping three mint drops, which she proceeded to enjoy, glancing now and then up into grandma's face with evident confidence in future unlimited supply.

"Ah," said Frank, "I see now the way to Daisy's heart."

"So do I," laughed Bessie, and singing gaily, "Oh, peppermint drop of my heart," she waltzed the child around so vigorously that grandmother had to interfere.

When they were quieted, May asked:

MINT.

"Grandmother, why do you always get mint drops? They are not half so good as chocolate."

"But more wholesome," answered grandmother. "Mint is a very useful herb."

"What for? I have never seen it."

"Oh, yes, it grows in the garden, and you are extravagant in your liking for mint sauce."

"Is that the same as this in the candy?"

"Certainly; and the same as that in your mother's menthol lotion and menthol pen-

cil, which sometimes helps her nervous headaches and soothes her to sleep. The botanical name menthol is in honor of a nymph said to have been changed into this plant."

"Where is peppermint made?"

"In New York, Ohio, and Michigan. Many acres are planted with the herb, which is cut like hay, dried in the sun, and then the oil pressed out of it. The larger part is sold to candy-makers."

"For Daisy," added Bessie.

Grandma smiled, and added, "It is in bloom now; run to the garden and bring me a sprig of it."

Away danced the children, bringing back a large bunch of the mint. Only a few blooms they found, but enough to attract Aunt Mary, who came in as they did, and soon had her microscope, examining the small flower.

"The simple common mint," said she,

"gives its name to a large family of plants."

"Do we know any of them, Aunt Mary? Just give us an introduction to the family circle, please."

"Go into your mother's store-room, and you will find on her spice-shelf several which you have met before. If your eyes fail to recognize them, your nose and tongue will, for there is thyme, and sweet basil, and savory, and rosemary, and lavender, and ditany, and horehound — "

"Oh, horehound candy for coughs! That bitter stuff!"

"Yes, but as good medicine for you as kitty's is for her; you laugh to see her roll over it and eat a little sometimes."

"Why, that is catmint!"

"Yes, and one of the family. So is the sage, or salvia. The name means saving, and was given to the plant because people thought a tea made of it would cure

almost every disease. Some of these plants are beautiful. That crimson salvia on your flower bed is a fine specimen. People in old times thought much of these herbs. An old-fashioned garden was bordered with them. Away back further still, Pliny recommended that the mint pennyroyal be hung in sleeping rooms as more healthful than roses."

"Not our common pennyroyal of the fields, Aunt Mary?"

PENNYROYAL.

"The very same. Do you remember the poor old woman who used to sit on the curbstone with a basket of lavender to sell?"

"Oh, yes; she looked so wistful, and then so glad when you bought some bunches; but is lavender a mint?"

"Yes; the name shows that it was once much used in 'laving' or bathing. The dried leaves are put in chests of linen. 'Laid up in lavender' was once a common expression. It is still used as a perfume. So is rosemary, which has such a pretty signification, 'dew of the sea,' having once grown abundantly on the banks of the Mediterranean. All parts of the plant have an aromatic odor and taste. In Europe it was formerly used both for marriage and funeral garlands, being the herb of fidelity and remembrance. At present, it is highly esteemed in Germany, and florists prepare pots of it

WILD THYME.

for sale in the windows by earliest spring time. Marjoram has also a pretty meaning — 'delight of the mountains,' but our 'sweet marjoram' will grow in low grounds; so will thyme."

"I don't know a bank whereon the wild thyme blows," laughed May. "Is thyme in our garden too, Aunt Mary?"

"Yes; not far from the lavender border, and in the meadow just beyond the garden, you will find a bunch of brunella."

"What is that?"

"That is what the French call prunelle. An old French proverb says, 'One needs no surgeon who has prunelle.' The popular name is self-heal. So I suppose it was once considered a valuable medicine. The botanical name, *Brunella vulgaris*, comes first, from the German *Bräun* — the quinsy, the plant being a remedy for quinsy. *Vulgaris* was added to the first name because the plant grew everywhere."

Hyssop.

"Any more of my acquaintances in the family connection, aunt?"

"Yes; I think you have at least read of the hyssop used by the Jewish priests to sprinkle the blood of the sacrifices, and of the passover. That is also a labiate. Do you know the meaning of that word?"

"I think I do. It is in my Latin lesson, 'having lips.' But what has that to do with plants?"

"Look at these mint flowers and see; they have two lips. The

upper one is divided in two parts; the lower one, in three. All the Mint family are labiates."

"Is that the way to distinguish the family?"

"Not entirely; for the plants of the Figwort family are labiates also, but there is an important difference. Look at the bottom of this pistil; the germ or ovary is deeply divided in four parts, while in the figworts they are divided in two parts only. Then the Mint family have square stems and are aromatic herbs; the leaves are opposite, and the flowers grow in clusters or spikes. The foliage of some of the family is their chief attraction. Our public gardens are made beautiful with the showy leaves of the coleus. Lovely as flowers are the shaded leaves of crimson, and brown, and orange, and green, and yellow, and soft silvery white. Numberless varieties show the skill of the

gardener in increasing nature's loveliness."

"Any more mints that I can find?" asked Bessie.

"There are many more in the family," replied her aunt, "but not in the garden or fields near, except the pretty ground-ivy, and motherwort, and — "

"That must be the best of all," interrupted Madge, hugging her mother as she sat down by her.

"A very good plant, my dear, if you believe the Russian peasants, who say it will cure the bite of a mad dog, and prevent hydrophobia. At any rate, it is considered here a good tonic. There is still one other mint that you may find — the sweet basil."

"Oh, I know that."

"Yes, you know the one in the garden, but there are forty species of basil, and in the East Indies the common people

regard the plants with superstitious reverence because of their supposed power as disinfectants. Now run out and get me a bouquet of the labiates; I am very fond of their aromatic odors."

CHAPTER XI.

THE NETTLE FAMILY.

Little Robert Winter sat on the door-step holding one foot, with face so puckered that you imagined the nettle he had trod upon had gone into the round, fat cheek instead of his toe. He was a very small boy, however, and that was his first experience with nettles; the first time he had ever gone barefooted in the country. His mother, who appeared just then, knew what to do, and soon the toe was all right, but Robert declared he wished there wasn't a nettle in the whole world.

"Then you would have to do without a good many nice things," said she.

"What, mother?"

"Your ball, for one thing."

"Why, that is made of India rubber."

"And from the caoutchouc tree," added Madge, who had a feeling remembrance of spelling the word wrong once upon a time.

"Yes," said Mrs. Winter, "but the caoutchouc is one of the Nettle family; one of the most useful."

"Where does it grow?" asked May.

"In the East Indies, and in South America. Beautiful forests of the large trees are found in India growing on the mountains, twenty-two thousand feet above the sea level. The natives gash the trees in several places and set clay cups to catch the dripping juice, which is almost colorless. They mould it, as it hardens, around clay moulds, thus forming hollow tubes for torches; also into the shape of bottles, animals, and many fanciful forms. It is a custom among the natives to present a guest with one of the

bottles and a hollow tube for squirting water into the mouth after eating, and from this custom the name 'seringat' was given to both gum and tree. It would take some time to tell you all that is made of the gum, alone or mixed with other materials; but if you put nettles out of the world you could have no rubber ball, boots, pants, coat, cap, shoes, or life-preservers. Then think of the buttons, combs, belts for machinery, hose for the fireman's reel, and thousands of other things."

"Well," said May, "I guess the rubber tree don't have thorns; but is there any other good nettle?"

"Oh, yes; one you are very fond of."

"I know," said Madge; "the apple?"

"No," laughed her mother, "not that, but the fig. Those you saw growing in Florida and the dried figs we get from Turkey and other foreign countries."

"Best things in the world," exclaimed Robert. "I could eat a hatful. Tell me another good eating nettle."

"I do not know that any of them eat," she said, "but if you ever go from California across to some of the Pacific islands, you will find a magnificent nettle tree, the bread-fruit, with great leaves more than a foot long and ten inches broad, and the fruit more than six inches in diameter. The seeds, when roasted, are like chestnuts, but the best variety has no seed. You should see the ovens in the ground in which they bake the pulp after the thick shell has been removed."

"Does it taste like bread?" asked Bessie.

"Like bread made with eggs. The fruit must be gathered before quite ripe. It will keep for months if buried in the earth. The fibrous bark of the tree is used to make tapa, or bark cloth."

"What strange trees they have in those countries," said Madge. "I remember reading about a banyan tree growing in India."

"Yes; that is nearly related to the fig Robert likes so much. Botanists call it *Ficus religiosa*. It is the most outspreading member of the Nettle family. One tree growing on the banks of the Nerbudda sheltered seven thousand men; another covered thirteen acres. The branches bend until they touch the ground, take root and send up another tree, whose branches again bend down to take root, and so one tree covers several acres. The wood is porous and useless, but the bark makes a powerful tonic, and the gum a healing plaster for bruises."

"Good for my sore toe, I guess," put in Rob.

"Perhaps so. I heard once of a plaster of figs which a prophet made and put on

Pagoda Fig of India.

a boil to cure a king; maybe you would like that kind better."

"Yes, indeed; but I don't think it would get so far from my mouth as my toe. Who was the king, mother?"

"Look in the second book of Kings and find out."

"Well, now tell me of another nettle that's good to eat, please."

"You like those purple mulberries, I believe. The wood of the tree is worth more than the berry, being one of the most durable of all woods. In England, they have a fine black mulberry which they esteem highly for desserts. But there is something which likes the mulberry better than you do, Rob."

Rob looked his doubts as his mother continued, "The silkworm feeds upon it. You should see how soon they eat a tree threadbare, or perhaps I should say silk-bare, for they eat to make silk, you know.

Then there is another mulberry raised in China and Japan for making paper. The tree is kept cut back that the young shoots may spring up more abundantly. These shoots are boiled to free them from the bark; then dried until the fibres separate, beaten into pulp, mixed with mucilage, and spread out to dry. The paper made of this is used by engravers.

"One other tree has been sometimes used to feed silkworms upon, the Osage orange. This member of the Nettle family gets its name from the Osage Indians. They make their bows of its strong, tough, elastic wood, and for this reason the French call it *bois d'arc*, which soon became changed to 'bodock.' The wood is yellow, the root a deep orange, yielding the yellow dye called fustic. The tree is covered with thorns, and makes fine hedges.

"In England the most important mem-

ber of the family seems to be the hop vine, raised for beer-making, three thousand

THE HOP PLANT.

acres being planted in the one county of Kent. Several of our northern and

western states plant it also. Like the rest of the family, the vine is tough and fibrous, and may be used in paper-making."

"But how in the world, mother," asked Robert, "do you know that all these trees and plants and vines belong to the Nettle family? They do not all have stinging hairs."

"No; the botanists look closely at the foundation of the flower and plant. All nettles are apetalous; that is, without petals. They have no corolla, and the stamens and pistils grow in different flowers, sometimes in different plants — they are either monœcious or diœcious. The calyx is free; does not grow on to the ovary of the pistil; there are as many stamens as divisions in the calyx; the inner bark is tough and fibrous; the leaves have stipules, falling early. The fig has no visible flowers; the flowers are within

a fleshy tube which ripens into fruit. And remember one more division of this family

Branch of the Elm.

— the elms, of which you have seen several varieties of beautiful and useful trees."

CHAPTER XII.

A FAMILY OF PITCHERS.

"WHAT a very little pitcher, and what long, long ears!"

Now there was not any pitcher visible, when a very small girl made this remark, but there were two "long, long" ears, and they were attached to a mite of a white rabbit, very pretty and very badly scared. Frank Stone had the soft white thing in a basket, showing it to "Aunt Charity." Why Frank called his sister May Aunt Charity he would not tell, but there was a tradition in the family that the little maiden was of a most inquiring mind, and that Frank only gave his pet the name when her questions came faster than he could answer them. The questions ended

on this occasion with the remark about little pitchers, which we can best explain in Madge's words: "Well, haven't I heard people say, 'Little pitchers have long ears'? They always looked at me when they said it, but I knew they didn't mean me, for I was not a pitcher. I think it must be this little dear, for it has the longest ears I ever saw — all lined with pink, too, to match its eyes. Dear me, I wish I *was* a pitcher — I'd like such pretty ears."

"There are pitchers and pitchers," wisely remarked Madge's older cousin.

"Cousin Kate," began Madge, — then she corrected herself, for this very aged cousin of hers had repeatedly desired her to say Cousin Catherine, as more appropriate to the dignity of a young lady of fifteen who had entered high school, — "Cousin Catherine, show me some of the pitchers."

Now Kate's remark had been only a quotation — the very latest, she thought with satisfaction; she had not anticipated this practical analysis of its meaning and was rather puzzled when called upon to produce the "pitchers and pitchers." But Aunt Mary — one of those good, convenient aunts, always on hand at the right time — had heard it all and came to Kate's relief, saying, —

"Bring me those studies of plants and insects, Kate; I'll show Madge some pitchers."

While Kate went for the portfolio the little pet dexterously slipped upon her mother's knee, ready for the pictures and pitchers.

Kate soon returned, looking by this time as inquisitive as Madge. The first plate was a curious bunch of flowers which Kate said she had never seen. Aunt Mary said they belonged to a

family which botanists called by the long name of *Sarraceniaciæ*, but which was better known as the Pitcher Plant family.

LEAVES AND STEM OF SARRACENIA.

"Where are the ears, Aunt Mary?" asked May, who had just come in.

"I did not promise to show you any ears; these pitchers have none." Evidently Aunt Mary did not intend to explain the old proverb to the child; she did not like it, anyway, and moreover, she *did* like the girl's good, healthy curiosity.

May was not entirely satisfied, but had a question ready to fill up any convenient gap, and so asked: —

"Do these pitchers hold water?"

"Yes, they all hold water."

"Now I remember," said Kate, "we read of travellers in some tropical regions who were almost famished for water, and found it in these little pitchers."

"Possibly a starving person might drink of it, but you would not think it either good or wholesome."

"Why, aunt?"

"Because so many had been drinking before you; you would probably find it

full of dead insects. They go there to drink and never come out any more."

"Ah, I see," said Kate, "it is a case of 'Walk into my parlor, said the *pitcher* to the fly'; but why can't they come out?"

"For a very good reason. The lid of the pitcher closes as soon as they enter. Then the little fellows are imprisoned. Running around, they try to escape, but every step presses out of the pitcher a sticky juice which flows over them until they are drowned in the sweet wine."

"That is just too bad, Aunt Mary. I don't like pitcher plants."

"Do not find fault with the plant too hastily, my dear; it lives partly on these insects, and that is its way of getting its food. I saw a little girl eating chicken this morning. She did not smother it in sweet juice as the flower did the fly: the cook only cut its head off," — Kate shud-

dered — "but neither the fly nor the chicken knew what was coming, so they could not suffer in anticipation as we do. God made them and all animals for our use; not to torture alive, as some poor horses are tortured, but to be killed instantly, when, if there be any suffering, it is only for a moment."

"But, aunt, why does the insect try to escape if it does not suffer in anticipation?" asked Kate.

"All insects instinctively try to get away when confined; it is a law of self-preservation given them by their Creator. The fly or spider will not remain quietly to let you put your fingers on them. Wild animals fly from the presence of man; only those which have been raised with us will allow us to come near them."

"Did you say the pitcher plant fed on the insects?"

"Yes, we are told that the plant juice

seems to have the power of digesting, just as the gastric juice of an animal's stomach aids in digesting the food eaten by the animal, and one curious California pitcher — the Darlingtonia — even puts out a bait for the insect. A small appendage smeared with honey hangs at the entrance to the tube, and

> "'Who goes up that winding stair,
> Will ne'er come down again.'

"This Darlingtonia is one of the six species found in North America. In Florida and Georgia you may find the Drummond, the spotted and the yellow trumpet; the latter with leaves two feet long — a good-sized pitcher they make."

"Do you mean to say that the *leaves* form the pitchers?" asked Kate.

"Yes. Some are simply rolled around into a tube which holds water, but the most curious are those which grow in real pitcher form, with lid and all. In the East

Indies there are thirty species of the genus Nepenthes. In these, the leaves are long and narrow, and at the end contracted into a tendril by which the plant climbs, but farther on this same tendril

The Pitcher Plant.

expands into a perfect pitcher five or six inches long with a lid exactly the size of the pitcher's mouth. This lid grows on with a hinge, formed by the same tendril which allows the lid to open and close.

It remains closed, however, until the leaf is grown and ready for the insect-catching business.

"These plants are found in swamps. In most of them the pitchers are a light green, but in Ceylon there is one with blood-red pitchers and with midrib or tendril so strong that the natives use it for cord. In Australia is found the smallest species. The cute little pitchers, from one to three inches long, would just suit you, Madge. They are beautifully finished too. Royal Worcester has not anything so fine as the lids of these little pitchers daintily veined with pink and fringed with delicate hairs."

"The hair fringes must be beautiful," said Kate.

"They are not only beautiful, but useful — to the plant at least: perhaps the insects would not agree with us."

"Why, Aunt Mary?"

"Because these pretty hairs get tangled in their feet and wings, and so between the sticky juice and the pretty fringe, they can't escape. There are other curious hair-fringed plants which do not belong to this family, but have ways so much like them that one suspects some relationship. The 'Venus fly-trap' for instance, whose leaves are not pitchers, but catch unwary insects quite as well. Around the edge of each leaf is a row of hairs like eye-lashes; and near the centre of the leaf are six hairs, so sensitive that the moment the tiniest insect touches them, they spring like a mouse-trap; the leaf shuts instantly, the eye-lash hairs interlacing like clasped fingers, and holding

CATCHFLY.

tightly the venturesome insect. Then the juice of the leaf pours out to digest its insect food, very much as our digestion is carried on. You can put bits of beef upon the leaf and spring the trap in the same way, but a bit of wood will have no effect; showing that the plant wants something to eat and will not eat wood. Should you fasten a fly just out of reach of one of these leaves, the leaf will bend forward to reach it!"

"I never heard of such sensible plants; they are almost like people."

"They are certainly endowed with wonderful instincts. Long ago the common people of England believed that the roots of these plants would cure small-pox, but careful experiment has long since proved it to be a mistake."

CHAPTER XIII.

ORCHIDS.

"THERE comes Aunt Charity; I wonder what she wants to know now."

"Something you might do well to learn, perhaps," said Mrs. Winter. "May is a dear little questioner — you must not tease her, Frank."

"She don't mind it, auntie. She's a living, breathing interrogation point, and says she isn't ashamed of it, and don't mind the name, especially when I abbreviate it to Charry. Now listen, Madge," he whispered as May came closer.

Sure enough, the little girl only waited to give a loving kiss to her aunt and a nod to her cousins, then said: —

"Aunt Mary, please tell me the differ-

ence between a parasite and an epiphyte. I'm all mixed in my botany."

"Of course you are," exclaimed Kate; "that is what botany is for, with its long, hard names. I wonder why you like it."

"The names mean something, if you take the trouble to find it," said May.

"That is true," said her aunt; "now let us find out about these two. Frank knows something of Greek and Latin; perhaps he may give us help. We'll promise to ask questions as fast as he can answer them, won't we, girls?"

Frank thought that would be "taking advantage of a fellow."—"Besides, auntie," said he, "I have been out of school long enough to get rusty—but I think *epiphyte* is a Greek word. I know *epi* is a Greek prefix meaning 'upon'; I believe the whole word means a plant that has grown upon another plant. *Parasite* is Latin, I forget its meaning—suppose it is about the same."

"That is where May stumbled," said Mrs. Winter. "The literal meaning of *parasite* is one who eats at another's table, and earns his welcome by flattery.

"In botany, it is a plant that lives on some other plant and feeds on its juices. In zoölogy, it is an animal which lives on some other animal. The two words are very different, and describe different kinds of plants. An epiphyte clings to another plant and adorns it, but feeds on air — is an air-plant, in fact. The parasite roots itself in another plant and sucks the life sap out of it.

"People are sometimes called parasites, you know."

"I'd rather be an epiphyte," said May.

"Yes indeed, one can help to beautify other lives without drawing the life from them. But what have you read of epiphytes, May?"

"Not much, aunt; only that there are

ORCHIDS (AND PETUNIA).

one or two species in the United States. Did you ever see any?"

"Yes, in South Georgia and Florida I saw clinging to the branches of the beautiful magnolia a little plant with purple, greenish flowers, and hanging from the oaks and pines there was the long moss, which is no moss at all, but an air-plant common in those Southern states. In the cemetery of Bonaventure, at Savannah, it hangs, sweeping its gray-black fringes to the ground. One could almost imagine that Nature had put on mourning for her dead. You have all seen the mistletoe? Well, that is a parasite; so is the yellow vine called 'Dodder.' But some of the most beautiful plants in the world are epiphytes."

"What are they, mother?" asked Madge.

"The orchids; very strange and beautiful plants. A garden of tropical orchids would resemble a garden of birds, and

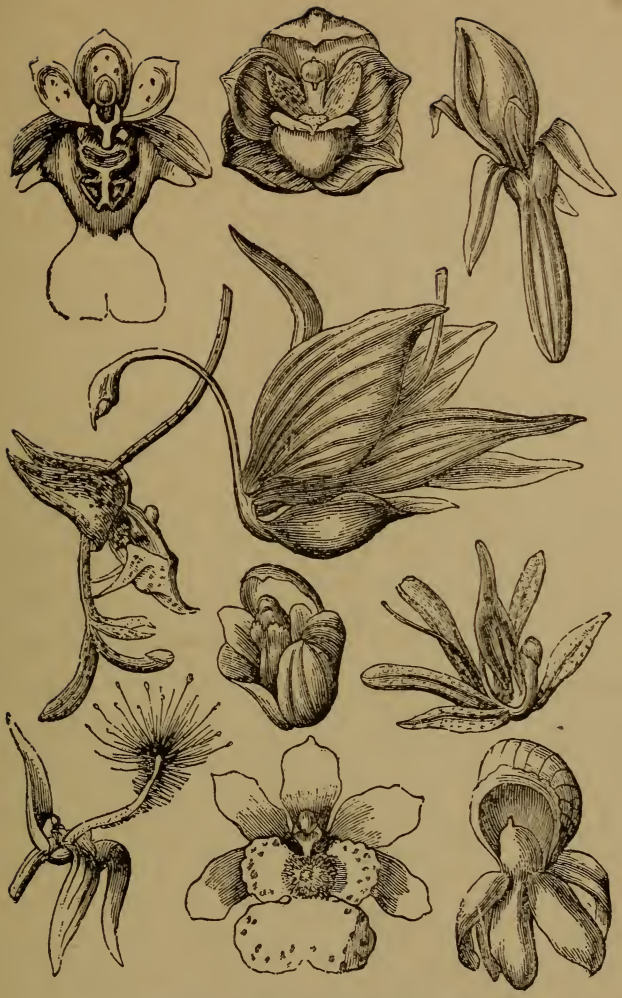
butterflies, and spiders, and all kinds of curious things, blossoming over the trees. Those of the United States are not so fanciful and grow out of plain Mother Earth — very wet earth it is, in bogs and marshes, where boys and girls cannot get at them in their picnics."

"Oh dear!" exclaimed May; "I was just going to propose a picnic, to hunt them."

"You may find one, now and again, straying out into society on the edge of the low grounds; and a few simple species grow higher up. Many conservatories have them, but they come from foreign countries."

"What species have we here, aunt?"

"Quite a number, dear. There are the white, and yellow, and purple fringed orchids, whose lip-like petals are cut in delicate fringes. In one of them — the Calopogon, or 'beautiful beard' — the lip



Forms of Orchidaceous Flowers.

seems to be fastened on with a hinge and bearded with long white, yellow, and purple hairs. Another is called 'Ladies' Tresses,' the petals being twisted into spiral curls; a more curious one is the Lady's Slipper."

"Does it really resemble a slipper?" asked Kate.

"Certainly, one of the Chinese pattern, thick and short, and turned up at the toe. Curiously enough, there are two long, narrow green leaves growing from where the slipper should be tied. They are not tied, however, but hang down several inches, just about the width and length of slipper strings."

"Fairy slippers!" said May. "What colors are they?"

"Satin-white for the fairy dance, dainty canary for evening wear, and deeper yellow for dress parade."

"Must be Netherland fairies, with that yellow livery," suggested Frank.

"Or possibly the slippers belong to the trousseau of another member of the Orchis family, — *Arethusa*, the fountain nymph, — a very pretty little rose-pink nymph growing out of a very ugly fountain, one of the wet bogs, north."

"Is that all, auntie?"

"Oh, no; it is a large family, with as many species as Solomon had proverbs. We have been talking only of the simpler kinds which grow in this country.

"The most beautiful and wonderful plant known in the world is an orchid of Central America, *El Spirito Santo*, the 'Holy Spirit plant.' The petals form a case of alabaster whiteness, within which is enclosed a delicate bird with wings outspread, almost perfect in form. The natives, with superstitious reverence, carry it in festivals, as representing the Holy Spirit."

"Are there no useful orchids, auntie?" asked Kate.

"It is always useful to be beautiful, as God intended, and we may be sure that any beautiful plant helps the world to praise God. When we learn as much of orchids as we know of other plants, we may find many useful things they have in store for us. One species furnishes our vanilla; another, a strong glue, hence its name, 'Putty Root'; but it is also called 'Adam and Eve.'"

"Why so, aunt?"

"The only reason we can imagine is that the bulbs grow in pairs, the second coming always just in front of the first—"

"Eve-like," whispered Frank.

"The oldest of the pair dies, and the second puts out a bulb in front, and so on, year by year; the position of the plant gradually changing as the years go on; thus—

"'The orchis takes
Its annual step around the world.'"

"Rather slow walking," remarked Frank.

"Yes, but step by step one goes a long way, you know."

TUBERS AND ROOTLETS.

"You like the tortoise pace then, my good aunt?"

"Not at all, Frank. On the contrary, I believe the tortoise not only slow, but

lazy, and prefer the hare. The fable only meant to teach that perseverance accomplishes more than fitful effort, however wonderful."

"What coat of arms does this distinguished family wear?" asked May.

Floral Envelope.

"Their escutcheon is very plainly marked in the peculiar structure of the flowers. The corolla and calyx are one, — a perianth, — and that grows on to the ovary or lower part of the pistil, while the

stamens grow on to the upper part, either the style or stigma: they are *gynandrous.* The irregular flower is in three parts, one of them larger and of different shape — so lip-like, oftentimes, that the name Sabellum was given it. Insects carry the pollen masses from one plant to another. At the bottom of the flower tube is a drop of honey; in reaching after this, the insect gets its long proboscis smeared also with pollen dust, which it carries to the next flower. In Madagascar there grows an orchid with the flower tube, or nectary, nearly a foot deep, and there also we find a moth with proboscis to match. Evidently the Creator designed the plant and insect for each other."

"But how many proverbs did Solomon write?" asked May, edging in a parting question as she saw her aunt rising to go.

"Ah, I did not say. Ask your Sunday-school teacher."

May at first looked disappointed, then called to her aunt: —

"Stop one moment, Aunt Mary, please. Won't you promise to give us as many talks about plants as Solomon had proverbs?"

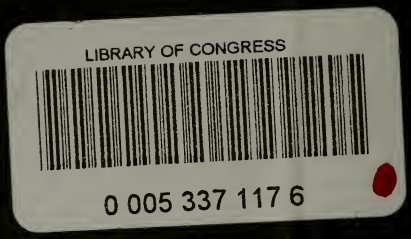
"Ah, little friend, you have me now," said Aunt Mary, laughing; "that would be too *long* a promise. But come to me to-morrow, and we will talk it over."

To-morrow brought not only May, but all the cousins, and all pleading for "talks about plants," "wild-flower picnics," and fern excursions — not one word about studying botany. Aunt Mary proposed a club, which should meet once a week, with books and microscopes for the real study of plants from root to seed.

"Will you meet with us?" asked May.

"Once a month," she answered, "and you may come to me whenever in doubt how to class a flower or trace a family likeness."

The club was formed. It met generally in the woods, and all that summer the trees, and flowers, and ferns, and mosses listened to wise discussions about themselves, surprised to learn how wonderfully they were made; while the girls declared with Aunt Mary, that Solomon must have been studying botany when he said: "He hath made everything beautiful in his time."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